CLAIMS

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1. Process for the formation of a coating of metal oxides comprising at least one precious metal from Group VIII of the Periodic Table of the elements, optionally in combination with titanium and/or zirconium, on an electrically conductive substrate; the said process consisting in applying, to the said substrate, a solution comprising at least one organometallic compound and in then converting the said organometallic compound(s) to metal oxide(s) by means of a heat treatment; the said process being characterized in that the electrically conductive substrate is made of steel or of iron and in that the sole solution applied to the said substrate is a non-aqueous solution of metal acetylacetonate or of a mixture of metal acetylacetonates dissolved in a (plurality of) solvent(s) which specifically dissolve(s) each metal acetylacetonate, the solvent(s) being chosen from alcohols, ketones, chloromethanes or a mixture of two or more solvents mentioned above.

2. Process according to Claim 1, characterized in that the precious metal from Group VIII of the Periodic Table of the elements is ruthenium, rhodium, palladium, osmium, iridium or platinum.

3. Process according to Claim 2, characterized in that the precious metal is ruthenium or iridium.

4. Process according to Claim 3, characterized in that the precious metal is ruthenium.

5. Process according to Claim 1, characterized in that the alcohol is ethanol or isopropanol.

6. Process according to Claim 1, characterized in that the ketone is acetone.

7. Process according to Claim 1, characterized in that the chloromethane is chloroform.

8. Process according to any one of Claims 1 to 7, characterized in that the metal acetylacetonate solution is obtained by dissolution of the said metal acetylacetonate in its specific solvent or in a mixture of solvents comprising the specific solvent.

9. Process according to any one of Claims 1 to 7, characterized in that the solution comprising several metal acetylacetonates is obtained:
   - either by dissolution of the said metal acetylacetonates in a mixture of solvents comprising the specific solvents for the said metal acetylacetonates;
   - or by mixing solutions comprising only a single metal acetylacetonate which are obtained by dissolution of the said metal acetylacetonate in a specific solvent or in a mixture of solvents comprising the specific solvent for the said acetylacetonate.

10. Process according to any one of Claims 1 to 9, characterized in that, in order to obtain the coating of metal oxide(s), the substrate made of steel or of iron is pretreated, in a first stage, and then, in a second stage, the solution comprising the metal acetylacetonate(s) is deposited on the said pretreated substrate and the substrate thus coated is dried and then calcined.

11. Process according to Claim 10, characterized in that the drying is carried out at a temperature at most equal to 150°C.

12. Process according to Claim 10, characterized in that the substrate coated by the metal acetylacetonate(s) is calcined under air or else under an inert gas enriched with oxygen, at a temperature at least equal to 300°C and preferably at a temperature of between 400°C and 600°C, for a period of time ranging from 10 minutes to 2 hours.

13. Process according to Claim 10, characterized in that the second stage is repeated at least once and is preferably repeated between 2 and 6 times.

14. Electrically conductive substrate made of steel or of iron carrying a coating of metal oxides which is formed by means of a process according to one of Claims 1 to 13.

15. Use of the electrically conductive substrate according to Claim 14 in the production of an activated cathode.

16. Use of an activated cathode according to Claim 15, in the electrolysis of aqueous solutions of alkali metal chlorides.

17. Use according to Claim 16, characterized in that the aqueous solutions of alkali metal chlorides are aqueous sodium chloride solutions.

18. Process for the manufacture of chlorine and alkali metal hydroxide by electrolysis of the corresponding chloride by means of a cathode according to Claim 15.

19. Process for the manufacture of alkali metal chlorates by electrolysis of the corresponding chloride by means of a cathode according to Claim 15.